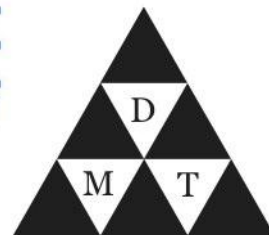MTI Follow-up Webinar

Composing and Decomposing Numbers

Grades K-6

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Suggestions for usage

This webinar is designed to assist teachers, administrators and instructional coaches in investigating context that emphasizes composing and decomposing number as applied to the Common Core State Standards. Participants will be expected to complete tasks for different grade levels. The webinar will highlight the different modes of representations students may use to solve the tasks. This webinar will show the connections between the strategies and models from Kindergarten through 5th grade. The context and models are aligned with the Common Core State Standards.

Materials Needed

Teachers will need the Participant's Guide and the *Warm Up* blackline prior to the webinar.

A recording of the *Composing and Decomposing Numbers: Grades K-5* webinar to project or share with participants. Ensure you have audio for the archived webinar.

Procedures and Discussions

1. Before viewing the webinar, teachers need to have paper and pencil, the *Warm Up* blackline and the Participant's Guide.
2. Solve the *Warm Up* problem with the group. Have participants share the different ways they solved the problem on the number line. Discuss the following questions with the participants:
    a. How does using the number line model connect with decomposing?
    b. What is important about the different approaches to solve the problem on the number line? (add up the 10's and then the 1's or to get to a "friendly number")
    c. Is it important for students to be able to do both? Why or why not?
    d. What prior knowledge must student have in order to successfully solve this problem using composing/decomposing?
3. **As a facilitator, you may want to pause the webinar after each task to allow participants time to work on and discuss their strategies and models. Review the *Extension* section if you want to do more focused discussion at those times.**
4. Begin the webinar.
5. Review of the 4 Tasks:
    a. You may want to take a longer pause (Slide 36) to have the discussion among your group. Here are the questions to ask your groups:
        i. How does the understanding of decomposing 7 helps us in later tasks?
        ii. What models and strategies are important for students to have knowledge in the primary grades to help provide flexibility in solving multiplication and division tasks?
6. Common Core State Standards slide:
    a. You may want to take a longer pause (Slide 38) to have the discussion among your group. Here are the questions to ask your groups:

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Have each grade level share their interpretation of the standard at their grade level and how it connects to the grade level before (exception of Kindergarten).
For 3-5 grade teachers: discuss how the understanding and use of composing and decomposing numbers fits with the properties of operation.

Extensions

If you would like to extend the webinar into a more in depth professional development, here are some suggested extensions for the tasks from the webinar.

1. For Task 1
   a. After participants solve the task and have viewed the descriptions of the different modes of representation, compare and contrast the different solution strategies and models.
      i. Which strategies and models are the most informal? What information can you gain from students who always solve with enactive models?
      ii. Which iconic representations would be the most helpful for enactive students?
      iii. For students who just write equations or create a table, what questions would you ask to ensure they have a mathematical understanding of relational thinking?
   b. Write a new context that would press students to decompose numbers.
      i. Which number sets would you use?
      ii. What would you predict students would do when given this context? How will you prepare to press them to a more iconic model or to make connections to other strategies?
2. For Task 2
   a. Consider which items people chose to buy? Why did they choose those items? Was it the price? Was it their favorite item?
      i. The price choice of the items was intentional. 15 cents is half of 30-would students choose that item because they could do the calculation in their heads? 23 cents would be difficult if students did the traditional algorithm, but not if they counted up-23 is close to 3o. 6 cents would be easy if students decomposed it into a 5 and a 1. Be intentional with number sets you give students to help them practice or learn new strategies. You can learn a lot from asking students about why they bought that specific item.
   b. If there had been 36 cents in the purse, what 4 prices would you choose for the items? Why did you choose those prices? Create number sets that would support your grade level-be intentional with your number choices to emphasize big mathematical ideas.
   c. Look at the symbolic representation for this task that is circled in blue.
      i. Create a number line that models that strategy.

      ii. Compare your number line to the arrow language notation. Which one would you want your students to do and why? What does a number line provide that the arrow language doesn't?

      iii. Notate the following student strategy on a number line and with arrow language:

            1. "I wanted to buy the doll for 18 cents. So, I took 20 cents from the 30 cents. That left me with 10. But, the doll was only 18, so I added by 2 to get to 12 cents. That's my answer"

3. Task 3
   a. Have participants write a new task that would drive a different iconic representation (i.e. ratio table) with a number set appropriate for their grade level.
   b. Have participants write a task that will drive the same iconic representation (area model) with a number set appropriate for their grade level.
   c. Create an iconic representation of the symbolic representations.
   d. Change the number sets in the problem and create an enactive, iconic and symbolic representation.
   e. Have the participants identify where composing and decomposing number appears in their representation and how it applies to the properties of operations.

4. Task 4
   a. Have participants write a new task that would drive a different iconic representation (i.e. area model) with a number set appropriate for their grade level.
   b. Have participants write a task that will drive the same iconic representation (ratio table) with a number set appropriate for their grade level.
   c. Create an iconic representation for the partial products example on the slide.
   d. Change the number sets or add additional numbers of jugs to find to continue the use of a ratio table
   e. Have the participants identify where composing and decomposing number appears in their representation and how it applies to the properties of operations.
   f. For the extension problem it may be helpful to have several ratio tables shared and discussed to help the group make connections to the various ways that 289 can be composed.
   g. Extra time may be taken on the "connections to place value" slide to ensure understanding of the increase and decrease of place value. Participants could create a string of problems and questions to ask students. (some examples below)

      i. 2x6
      ii. 2x60 (what happened to the 12 --> ten times larger, 12 tens)
      iii. 2x0.6 (what happened to the 6? 12? --> ten time smaller, 6 tenths and 12 tenths)
      iv. 2x0.06
      v. 0.2x0.6